

METHOD FOR PRESENTING A VIRTUAL REALITY
ENVIRONMENT FOR AN INTERACTION

CROSS-REFERENCE TO RELATED APPLICATION

5 **[0001]** This application claims the benefit of U.S. Provisional Patent Application No. 60/431,679, filed 12/7/2002, titled, "Video display that generates an experience in a virtual reality", which is incorporated herein by this reference.

BACKGROUND

10 1. Technical Field

[0002] The present invention relates to presenting a scene on a display. More particularly, the invention concerns presenting a virtual reality setting for an interaction on a computer/video display.

15 2. Description of Related Art

[0003] Various types of computer-based games and entertainment products are widely known. For example, software products for playing games on computers, such as chess, checkers, Monopoly[®], and Risk[®], as well as software entertainment products that feature video performers, are generally available.

20 **[0004]** Computer-based games often display an icon or figure that represents a player of the game, a board that shows the locations of playing pieces, and a background. Frequently it is desirable to make the player or players, and the background, appear as realistic as possible. However, backgrounds for games typically are monochrome or a simple drawing, and players are typically represented by icons or drawn figures. These
25 representations of backgrounds and players lack realism because they are merely artist's renditions. Additionally, the behavior of computer-generated players in games and performers in entertainment products has generally been limited and unrealistic.

[0005] The playing area for computer-based games is typically displayed as a two-dimensional top-down view of a playing board, or as a three-dimensional angled

view of the board. However, both views cannot be displayed simultaneously, and the three-dimensional view does not facilitate easy interpretation of the game situation by a human operator.

- 5 [0006] In summary, previously known techniques are inadequate for realistically displaying real-world representations of a background and a player or performer in a virtual-reality environment. Additionally, previously known games do not have the capability to portray a playing area, such as a playing board, in a realistic and easily interpreted manner in a virtual-reality environment.

SUMMARY

[0007] An example of one aspect of the invention is a method for presenting and controlling a digital background for a real-world setting in a computer display. The method includes presenting a background, and inputting an operator's choice of action or inaction to a situation state module. The method also includes updating a current state based on the operator's action or inaction, and using the current state by a decision logic to determine how to control the background in the setting.

[0008] An example of another aspect of the invention is a method for presenting a character for an interaction. The method includes presenting a series of individual video clips that are joined into the appearance of a continuous streaming image of the character, and inputting an operator's choice of action or inaction. The method also includes updating a current state based on the operator's action or inaction, and using the current state by a decision logic to determine a response in a setting by the character, and modifying the character.

[0009] An example of another aspect of the invention is a method for presenting a virtual reality setting for transferring information pertaining to a gaming situation to a human operator. The method includes presenting a three-dimensional representation of a playing area. The method also includes presenting a two-dimensional representation of the playing area, wherein the three-dimensional representation and the two-dimensional representation are presented on a single video screen to allow an operator to simultaneously observe action in both two and three dimensions.

[0010] An example of another aspect of the invention is a method for presenting a digital environment for an interaction. The method includes presenting a background, and setting a character against the background. The method additionally includes presenting a three-dimensional representation of a playing area, and also includes presenting a two-dimensional representation of the playing area.

[0011] An example of another aspect of the invention is a method for presenting a virtual reality setting for an interaction. The method includes presenting a background, and setting a character against the background. The method also includes inputting an

operator's choice of action or inaction, and updating a current state based on the operator's action or inaction. The method further includes using the current state by a decision logic to determine a response in the setting by the character, and modifying the character using a library of videos.

5 **[0012]** An example of another aspect of the invention is a method for presenting a virtual reality environment for an interaction. The method includes presenting a streaming video of a real-world background scene, and presenting a series of individual video clips that are joined into the appearance of a continuous streaming image of a real-world character. The method further includes inputting an operator's choice of action or
10 inaction, and updating a current state based on the operator's action or inaction. Additionally, the method includes using the current state by a decision logic to determine a response by the character, and modifying the character.

[0013] An example of another aspect of the invention is a method for presenting a virtual reality setting for an interaction. The method includes presenting a streaming
15 video of a real-world background scene, and presenting a series of individual video clips that are joined into the appearance of a continuous streaming image of a real-world character. The method also includes inputting an operator's choice of action or inaction, and updating a current state based on the operator's action or inaction. The method
20 further includes using the current state by a decision logic to determine a response in the setting by the character, and using the current state by the decision logic to determine a selection of how to control video of the character and how to control video of the background. Other aspects of the invention are described in the sections below.

[0014] The invention provides a number of advantages. For example, the invention advantageously provides the illusion of immersing a human operator in a real-
25 world scene where a game (or other interaction) is played, while displaying a playing area in an easily interpreted manner. The invention also provides a number of other advantages and benefits, which should be apparent from the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 shows a video display that simulates a life-like experience in accordance with an example of the invention.

5 [0016] FIG. 2 shows the procedure for software designed to operate a video display in a continuous fashion, in accordance with an example of the invention.

DETAILED DESCRIPTION

[0017] The nature, objectives, and advantages of the invention will become more apparent to those skilled in the art after considering the following detailed description in connection with the accompanying drawings.

5 [0018] This invention relates to the use of a digital background in a video/computer environment that gives the illusion of the human operator(s)/player(s) being immersed in a real-world scene where the game is being played through the use of 1) a continuous streaming video or animated character(s) set against a digital background, 2) "triggers" to control the video or animated character to respond continuously to 10 situations in a game or to the time between moves or other facets related to the human operator's/player's actions or inactions, 3) a simultaneous juxtaposition of a three-dimensional view of a playing board, as would be seen in real life, and a two-dimensional view of the same playing board overlaid on the background scene, with the potential for said top-down view to be see-through, allowing the player to continue to feel immersed 15 in the scene.

[0019] FIG. 1 shows the invention of a video display that simulates a life-like experience.

[0020] FIG. 2 shows the procedure for software designed to operate the video display in a continuous fashion.

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Reference Numerals in Drawings

[0021] 10 Video interface for visual information transmission from a machine to a human operator (also called a "display")

[0022] 12 Digital background for real-world setting

25 [0023] 14 Animated/video character

[0024] 16 Three-dimensional view of the playing arena

[0025] 18 See-through two-dimensional view of the playing arena

[0026] 20 Human operator/player

[0027] 22 Situation state of the digital environment

[0028] 24 Decision logic relating situation triggers to courses of action and videos/animations

[0029] 26 Course of action

[0030] 28 Video/animation controller

5 [0031] 30 Library of videos/animations

Description-FIG. 1 & FIG. 2-Preferred Embodiment

[0032] A preferred embodiment of the present invention is illustrated in FIG. 1 and FIG. 2. A means for visual transmission of information from a video interface 10 of any kind is presented to a human operator(s)/player(s) 20. A digital background 12 is presented in the screen/display 10 such that the human operator(s)/player(s) 20 have the feeling of being immersed in a virtual reality setting where a game or other interaction takes place. Continuously streaming video of the background 12 and a video/animated character 14, where video is of any kind and animation can be of cartoon, cell, or clay, or other medium, set against the digital background 12 provides a greater illusion of virtual reality. "Triggers" control the video/animated character 14 to respond in a continuous fashion to game situations including actions and inaction by the human opponent. The simultaneous juxtaposition of a three-dimensional representation of a playing board or arena 16, as would be observed by a human in reality, together with a two-dimensional representation of said playing board 18 or arena using top-down view provides additional utility to the human operator(s)/player(s) 20. The two-dimensional view 18 can be transparent and is overlaid on the background scene 12 and therefore does not interfere with the feeling of being immersed in a virtual reality setting. The preferred embodiment of the internal video controller 28 is illustrated in FIG. 2. Human operator(s)/player(s) 20 view a video display 10. Action or inaction on the part of the human operator(s)/player(s) 20 affects the situation state of the digital environment 22 that is to be presented on the display 10. A decision logic 24 relating current situation and triggers to course of action and videos/animations is used to determine the most appropriate update to the digital environment. The decision logic 24 can take the form of

a computer algorithm. Following appropriate decision logic, courses of action 26 can be presented to the display 10 for human interpretation or the decision logic 24 can interact with a video controller 28 to modify the character(s) 14 or background(s) 12 in the digital environment. The video controller 28 can either make a direct change to the character 14
5 on the display 10 or make use of a library of potential videos/animations 30 for a broader range of realistic variations. The video display 10 is updated and the process is repeated in a continuous fashion during the interaction with human operator(s)/player(s) 20.

Operation-FIG. 1

10 **[0033]** Using a computer screen or video monitor, information pertaining to a gaming situation is transferred to human operator(s)/player(s) 20. The gaming situation is designed to be realistic by the inclusion of a digital background 12 that provides the illusion of the human operator(s)/player(s) 20 being immersed in a real-world environment during game play. The digital background 12 can be provided by several
15 means including continuous streaming video or a series of concatenated still pictures generated to provide life-like movement in the background. A video/animated character 14 opponent is set within this digital background 12 providing the illusion of in-person gaming. A series of "triggers" controls the video/animation of the character 14 with responses that are continuous and different depending on the game situation. These
20 responses include movements both during and between moves of the character 14 and the human operator(s)/player(s) 20. These triggers include but are not limited to the human operator's/player's 20 sequence of moves during the game, and resulting strategic position during the game. The addition of a character video/animation 14 to a digital realistic background 12 with motion of the character 14 in a time-dependent manner
25 based on the interaction with the human operator(s)/player(s) 20 with motion of the background 12 in a realistic and continuous manner provides a means to simulate a life-like experience.

[0034] In the context of gaming within this virtually realistic digital environment, a three-dimensional view 16 of the gaming arena/playing board is shown as

would be seen in real-life from a player's perspective. A two-dimensional view 18 of the same playing board, using a top-down view, showing all corresponding movement from the game in the three-dimensional view 16 in both time and space provides a method for human interaction with the digital environment for ease of interpretation by the human operator(s)/player(s) 20. The two-dimensional top-down view 18 positioned in front of the digital background 12, can be transparent and therefore facilitates the human operator(s)/player(s) 20 to continue to feel as though they are immersed in the digital environment.

Operation-FIG. 2

[0035] Human operator(s)/player(s) 20 take the role of a player or other participant in a game or setting. The operator 20 observes the display 10, which provides information on the current situational state, and depicts the video/animation of at least one other character 14 in game or setting, as well as the background 12 display, and the state of the game or setting itself (for example, the positions of pieces on a playing board). The operator 20 chooses a suitable course of action, such as moving a piece or pieces in a game but may also include waiting (that is, remaining inactive). The operator's 20 choice of action or inaction is input to a situation state 22 module that updates the current setting based on the operator's 20 action or inaction. This state 22 is then used by a decision logic 24 to determine both a response in the game or setting by any computer-controlled opponent or player, as well as the selection of how to control the video or animation on the screen, which may include both the computer-controlled opponent(s) or other player(s), as well as other background scenery or other elements of the setting. The course of action and the selection of video display are put in place and sent to the display 10 mechanism to be shown to the human operator 20.

[0036] The invention may also be referred to as a video display that generates an experience in a virtual reality. The following entries describe examples of various aspects the invention:

[0037] Entry 1. The method of representation for a real-world settings as a digital background in a computer/video display comprising

- a) a still picture or continuously streaming video of said real-world setting
- b) a means to control the video to present changes within the context of a real-world setting.

[0038] Entry 2. The method of representation for a real-world potential opponent or other player as an animated or video character in a computer/video display comprising

- a) continuously streaming video or animation of said real-world potential opponent.
- b) a series of individual video or animation clips that are joined into the appearance of a continuous streaming image.

[0039] Entry 3. The combination of entry 1 and entry 2 within the context of a gaming situation for use of transmission of information regarding the game to a human operator/player to provide the illusion of in-person gaming.

[0040] Entry 4. The method of triggers to control the video in entry 2 such that the animated or video character responds continuously to situations presented by entry 3 due to situations in a game or to the time between moves or other facets related to the human operator/player's actions or inactions.

[0041] Entry 5. The method of representation for a real-world setting by comprising of

- a) a three-dimensional view of a gaming situation from a side view as would be seen in real life.
- b) a two-dimensional view of a gaming situation from a top-down view, with said view having the potential for being see-through

[0042] Entry 6. The combination of entries 5a and 5b on a single video screen allowing the human operator/player to feel immersed in the scene and simultaneously observe all action in both two- and three-dimensions.

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Other Embodiments

[0043] While the foregoing disclosure shows a number of illustrative embodiments of the invention, it will be apparent to those skilled in the art that various changes and modifications can be made herein without departing from the scope of the invention as defined by the appended claims. Furthermore, although elements of the invention may be described or claimed in the singular, the plural is contemplated unless limitation to the singular is explicitly stated.

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